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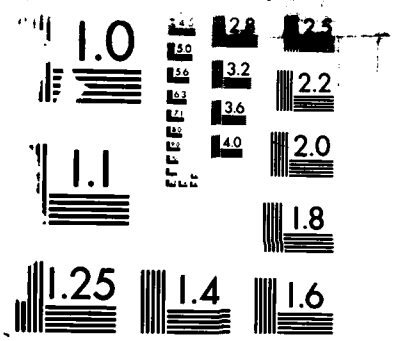

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Chemically dissimilar polymers are generally incompatible, and this incompatibility is even more marked for a coiling polymer in the nematic phase of a more rigid polymer. Phase diagrams were determined for the aromatic block conolymers of rigid and flexible units described in a previous paper. Flexible blocks enter the nematic phase formed by the rigid units. The flexible homopolymer also enters the nematic phase, but this seems to be due to the formation of an adduct involving the flexible and rigid polymers when both are polymerized simultaneously.

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Technical Report No. 2

Nematogenic Aromatic Block Copolymers of Rigid and Flexible Units. II. Phase Equilibria

by

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Phase diagrams were determined for the block copolymers described in Part I, and for mixtures of the homopolymers using as a solvent N,N-dimethylacetamide containing 5% LiCl. The volume fraction, ϕ, of the isotropic phase is plotted against the total polymer concentration. The critical concentration C_p^* (appearance of the biphasic region) and C_p^{**} (onset of the single nematic phase) were determined by extrapolation to $\phi = 1$ and 0, respectively. Also, the solubility, C_p^{***} of the crystalline phase was evaluated.

It appears from our results that the flexible blocks can enter the nematic phase formed by the rigid blocks. C_p^{**} exhibits a maximum when the block copolymer contains 10 mole percent of flexible PABH-T or 15 mole % of MPD-I. Thus, the block copolymers have a broader biphasic gap than the rigid homopolymer. Moreover, the flexible homopolymer also enters the nematic phase, whereas almost no compatibility is found on mixing the flexible and rigid homopolymers. Also, when the flexible homopolymer is extracted from the block copolymer, and then remixed with it, the C_p^{**} value is much lower. This may indicate that the flexible homopolymer, when polymerized along with the block copolymer, forms a metastable adduct. When the concentrated anisotropic phase is allowed to stand for 2 to 3 months, the adduct breaks down and some rigid homopolymer crystallizes from the nematic phase.

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